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(54) **DETECTING LEAKAGE FROM AN
INTERNAL SURGICAL SITE**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

4,953,548 A 9/1990 Stoddard et al.

7,837,669 B2 11/2010 Dann et al.

(Continued)

FOREIGN PATENT DOCUMENTS

WO 2005/096954 A2 10/2005

OTHER PUBLICATIONS

Mrowczynski et al., "A Biodegradable Ring Enables Growth of the
Native Tricuspid Annulus", Journal of Heart Valve Disease, vol. 20,
Issue 2, Mar. 2011, pp. 205-215.

(Continued)

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(57) **ABSTRACT**

A leakage detecting implant can detect leakage of body fluid
from an incision, resection, or other internal surgical site in
a subject. The leakage detecting implant can include: one or
more biodegradable colorant members having a tissue-
contacting inner surface and an opposite outer surface; a
resilient member having an inner surface coupled to the
outer surface of the one or more colorant members; and a
cover member having a body with an internal chamber and
an opening on a tissue-contacting side, the internal chamber
containing the resilient member and at least a portion of the
one or more biodegradable colorant members with the

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